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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
SINGH, RACHNA	

ART UNIT	PAPER NUMBER
2176	

DATE MAILED: 03/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/599,950	REJ, PAWEL	
	Examiner	Art Unit	
	Rachna Singh	2176	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 October 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-7,9-15,17-19 and 21-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-7,9-15,17-19 and 21-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is responsive to communications: Amendment filed 3/15/04.

2. Claims 1-3, 5-7, 9-15, 17-19, and 21-26 are pending. Claims 4, 8, 16 and 20 were cancelled by the amendment. Claims 1, 7, 13, 19, 25, and 26 are independent claims.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-3, 5-7, 9-15, 17-19, and 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kothuri et al., US 6,505,205, 01/2003 (filed 1/3/02, continuation 5/29/99).

In reference to claims 1, 7, 13, 19, 25, and 26, Kothuri teaches a method of creating a split tree from a set of multi-dimensional data items. Kothuri's system comprises the following steps:

-Taking a set of multi-dimensional data items by recursively dividing the data items into smaller clusters until each cluster can be stored in a single leaf node of a hierarchical (tree-structured) index. If a set of data items or a subset thereof is too large to fit in a single leaf node, a suitable dimension attribute in which to divide the data items is selected. Compare to ***"determining which of a plurality of nodes fit into a galley target"***. See column 3, lines 30-40.

-Determining whether the number of data items is greater than the node capacity. See figure 5. Compare to ***"setting one of the plurality of nodes as a current node for said galley target; comparing the size of the current node with available space in the galley target"***.

-If the node capacity is not greater than the number of data items, then clustering the data items into separate leaf nodes. See figure 5. Compare to ***"if the size of the current node is not greater. . .fits into the galley target"***

-If the node capacity is greater than the number of data items, then determining the variance in each data dimension, selecting the data dimension with the greatest variance, sorting data items in the selected dimension, dividing data into two or more subsets, calculating the number of data items in each subset and determining if the data items in any subset is greater than the node capacity. If it is not greater, clustering the data items into separate leaf nodes. If it is greater then selected a subset having more data items than the node capacity and repeated the steps of determining the variance . . .calculating the number of data items in each subset again. See figure 5. Compare to ***"if the size of the current node is greater. . .sub-steps of: determining whether the current node has at least one child node, setting one . . .at least one child node; and recursively executing steps (a2) to (a4) with respect to the new current node"***.

Kothuri does not state "marking the nodes that fit into said galley target with a mark specific to the galley target so as to create a split tree in which each tree fragment is identified by a respective mark, and wherein said split tree represent the input tree

and at least one tree fragment obtained by splitting the input tree"; however, Kothuri does teach that the first object in a database where the R-tree index is stored is configured to store information concerning the index (its dimensionality, fanout) and an identifier (an address, unique node identity) of a root node of the index. Kothuri also teaches that the second object can consist of a unique identifier of the corresponding node, an identifier of the parent node, sibling node, and a measure of the number of children in the node. See column 3-4. These identifiers are similar to the claimed "marks" as they are specific to the galley target and are used to create a split tree. See column 22, figure 5, and columns 24-25. Since Kothuri teaches using an identifier for the nodes in the galley target, it would have been obvious to one of ordinary skill in the art at the time of the invention to "mark" the nodes as a mark is simply a means for identification which is disclosed by Kothuri. A person of ordinary skill in the art at the time of the invention would understand that an identification of a "root node", as disclosed by Kothuri, is equivalent to a recognizing a tree fragment as a root node is used to indicate the start of a fragment. Thus Kothuri's marking of the nodes with a unique identifier serves the same purpose as the claimed invention's marking of nodes to create a split tree in that it identifies the root or start of a new tree fragment.

In reference to claim 2, 14, and 22, Kothuri does not teach checking to see if a start node has been marked; however, he does teach associating an identifier indicating a unique node identity of the root node. See column 3. The information also indicates the fanout and dimensionality of the node, thus indicating whether there is a child node. Furthermore, Kothuri teaches that the second object can consist of a unique identifier of

the corresponding node, an identifier of the parent node, sibling node, and a measure of the number of children in the node. See column 3-4. These identifiers are similar to the claimed "marks" as they are specific to the galley target and are used to create a split tree. See column 22, figure 5, and columns 24-25.

In reference to claim 9, Kothuri teaches that the first object in a database where the R-tree index) is stored is configured to store information concerning the index (its dimensionality, fanout) and an identifier (an address, unique node identity) of a root node of the index. Kothuri also teaches that the second object can consist of a unique identifier of the corresponding node, an identifier of the parent node, sibling node, and a measure of the number of children in the node. These identifiers are similar to the claimed "marks" as they are specific to the galley target and are used to create a split tree. See column 22, figure 5, and columns 24-25. Since Kothuri teaches uses an identifier for the nodes in the galley target, it would have been obvious to one of ordinary skill in the art at the time of the invention to "mark" the nodes as a mark is simply a means for identification which is disclosed by Kothuri. Kothuri further teaches that if a leaf node is chosen to receive a new data item that would exceed its capacity, there are two or more subsets created where data items are clustered into separate leaf nodes.

In reference to claims 3 and 15, Kothuri teaches that update operations traverse an R-tree to carry out the addition/removal of data items and the R-tree index is updated to reflect any modifications. See column 16, lines 5-16.

In reference to claims 5, 10-11, 17, and 23, Kothuri teaches that the first object in a database where the R-tree index) is stored is configured to store information concerning the index (its dimensionality, fanout) and an identifier (an address, unique node identity) of a root node of the index. Kothuri also teaches that the second object can consist of a unique identifier of the corresponding node, an identifier of the parent node, sibling node, and a measure of the number of children in the node. These identifiers are similar to the claimed "marks" as they are specific to the galley target and are used to create a split tree. See column 22, figure 5, and columns 24-25. Since Kothuri teaches uses an identifier for the nodes in the galley target, it would have been obvious to one of ordinary skill in the art at the time of the invention to "mark" the nodes as a mark is simply a means for identification which is disclosed by Kothuri. Kothuri further teaches that if a leaf node is chosen to receive a new data item that would exceed its capacity, there are two or more subsets created where data items are clustered into separate leaf nodes.

In reference to claims 6 and 18, Kothuri teaches that the root node has an identifier that indicates the dimensionality and fanout of that node. See column 3.

In reference to claims 12 and 24, Kothuri teaches that the first object in a database where the R-tree index) is stored is configured to store information concerning the index (its dimensionality, fanout) and an identifier (an address, unique node identity) of a root node of the index. Kothuri also teaches that the second object can consist of a unique identifier of the corresponding node, an identifier of the parent node, sibling node, and a measure of the number of children in the node. These identifiers are

similar to the claimed "marks" as they are specific to the galley target and are used to create a split tree. See column 22, figure 5, and columns 24-25. Since Kothuri teaches uses an identifier for the nodes in the galley target, it would have been obvious to one of ordinary skill in the art at the time of the invention to "mark" the nodes as a mark is simply a means for identification which is disclosed by Kothuri. Kothuri further teaches that if a leaf node is chosen to receive a new data item that would exceed its capacity, there are two or more subsets created where data items are clustered into separate leaf nodes.

Response to Arguments

5. Applicant's arguments with respect to claims 1-3, 5-7, 9-15, 17-19, and 21-26 have been considered but are not persuasive.

Applicant argues that Kothuri's invention, while drawn to tree structures comprising a plurality of nodes, is not seen to split an input tree into tree fragments and then mark the input tree in a manner that represents both the input tree itself and each of the tree fragments. Examiner respectfully disagrees. Kothuri teaches taking a set of multi-dimensional data items by recursively dividing the data items into smaller clusters until each cluster can be stored in a single leaf node of a hierarchical (tree-structured) index. If a set of data items or a subset thereof is too large to fit in a single leaf node, a suitable dimension attribute in which to divide the data items is selected. Kothuri teaches determining whether the number of data items is greater than the node capacity. See figure 5. If the node capacity is not greater than the number of data items, then clustering the data items into separate leaf nodes. See figure 5. If the node

capacity is greater than the number of data items, then determining the variance in each data dimension, selecting the data dimension with the greatest variance, sorting data items in the selected dimension, dividing data into two or more subsets, calculating the number of data items in each subset and determining if the data items in any subset is greater than the node capacity. If it is not greater, clustering the data items into separate leaf nodes. If it is greater then selected a subset having more data items than the node capacity and repeated the steps of determining the variance . . .calculating the number of data items in each subset again. See figure 5. See rejections above.

Applicant argues that Kothuri's invention differs fundamentally from the present invention because Kothuri teaches that a node has a specified fanout independent of the size and number of child nodes whereas the present invention takes into account the size of each child node which contributes to the overall size of the node, and nodes placed in the galley target reduce the available space in the galley target. Examiner's interpretation is that Kothuri's "specified fanout" inherently teaches taking into account the available space in the galley target in order to determine whether the current node would fit into the target. Please see figure 5 in which Kothuri teaches determining whether the number of data items is greater than the node capacity. If the node capacity is not greater than the number of data items, then clustering the data items into separate leaf nodes. If the node capacity is greater than the number of data items, then determining the variance in each data dimension, selecting the data dimension with the greatest variance, sorting data items in the selected dimension, dividing data into two or more subsets, calculating the number of data items in each subset and determining if

the data items in any subset is greater than the node capacity. If it is not greater, clustering the data items into separate leaf nodes. If it is greater then selected a subset having more data items than the node capacity and repeated the steps of determining the variance . . .calculating the number of data items in each subset again. In view of Kothuri's teachings, Examiner maintains position with respect to Kothuri teaching splitting an input tree into tree fragments.

Applicant argues that equating Kothuri's identifier with the claimed marking is overly broad and an unwarranted simplification of the invention to a mere identifier. Applicant argues that Kothuri's identifiers do not represent both the input tree and at least one tree fragment obtained by splitting the input tree. Examiner respectfully disagrees. Kothuri teaches that the first object in a database where the R-tree index is stored is configured to store information concerning the index and an identifier of the root node of the index. The second object consists of a unique identifier of the corresponding node, an identifier of the parent node, sibling node, and childe node. See column 3-4. The identifiers are similar to the claimed "marks" as they are specific to the galley target and are used to create a split tree. See column 22, figure 5, and columns 24-25. It would have been obvious to one of ordinary skill in the art at the time of the invention to mark the nodes as a mark is simply a means for identification and Kothuri discloses the use of an identifier to identify the various nodes (i.e. root, parent, child, sibling, etc). A person of ordinary skill in the art at the time of the invention would understand that an identification of a "root node", as disclosed by Kothuri, is equivalent to a recognizing a tree fragment as a root node is used to indicate the start of a

fragment. Thus Kothuri's marking of the nodes with a unique identifier serves the same purpose as the claimed invention's marking of nodes to create a split tree in that it identifies the root or start of a new tree fragment.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Johnson et al., US Patent 6,334,125 B1 12/25/01 (filed 11/17/98)

Kelly et al., US Patent 5,173,853, 12/22/92

Orr, et al., WO 98/10356, 3/12/98

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rachna Singh whose telephone number is 571-272-4099. The examiner can normally be reached on M-F (8:30AM-6:00PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Feild can be reached on 571-272-4090. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RS
5/26/04

JOSEPH FEILD
SUPERVISORY PATENT EXAMINER